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ABSTRACT

Examination of seven refereed journals over a 10-year period (1977-1986) identified 28 papers using single-subject research methodology in studies involving preschool-aged children with handicaps or their families. Five types of single-subject designs were found to be used both alone and in various combinations. Of the 30 research designs implemented in the 28 papers, multiple baseline designs were used most frequently (12 studies), followed by AB designs (six studies) and multitreatment (three studies). ABA and alternating treatments designs were implemented in one study each, and seven studies employed combinations of the designs. A low overall proportion of single-subject studies was found, accounting for only 28 articles out of the over 4,000 identified research studies involving preschool-aged children with handicaps or their families. This finding, coupled with the infrequent use of the ABA, the ABAB, and the alternating treatments designs, led to a recommendation for increased emphasis on preservice and inservice training in single-subject methodology. (JDD)

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Single-Subject Research in Early Childhood Special Education: A Survey of Seven Selected Journals -- 1977-1986

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Abstract

Seven refereed journals were surveyed for a ten-year (1977-1986) period with regard to the use of single-subject research methodology in studies involving preschool-aged (birth through five) children with handicaps or their families. Results are reported in terms of descriptive statistics for the types of subjects, types of design, and number of articles per journal. A sparcity of studies (only 28 found in over 4,000 articles) and questionable design selection led the authors to conclude that single-subject design competencies should be addressed in future training of ECSE personnel.

Single-Subject Research in Early Childhood Special Education: A Survey of Seven Selected Journals -- 1977-1986

Group comparison designs have traditionally been the most frequently used designs in educational research despite recognized limitations for dealing with problems in classroom settings. These limitations include (a) an inability to obtain information regarding the best treatment for individual children since behavior change in single subjects is obscured (Sulzer-Azaroff & Mayer, 1977), (b) the difficulty of identifying large numbers of children homogeneous for particular behavioral or skill-deficit problems (Barlow & Hersen, 1984), and (c) the notion that withholding a promising treatment from a control group is unethical (Barlow & Hersen, 1984; Gay, 1987).

In view of such shortcomings, single-subject designs have often been employed as an alternative in recent years. As Gay (1987) describes this trend:

> The use of single-subject designs has increased steadily since about the mid-sixties, paralleling the increased application of behavior modification techniques. Publication of the Journal of Applied Behavior Analysis in 1968 by the Society for the Experimental Analysis of Behavior, signaled a new acceptance for single-subject research, an acceptance based upon improved

> methodology. Whereas previously single-subject research was generally equated with a descriptive, case-study approach, it now became associated with a controlled, experimental approach. (p. 293)

Single-subject designs are especially suited to researching issues in the field of special education with its predominantly low-incidence populations. One such population is preschool (i.e., birth through five years) children with handicaps. Halle and Sindelar (1982) have suggested several advantages in the use of single-subject designs for studying behavior change within this population. In their view, the precise measurements of behavior provided by single-subject research enable teachers to distinguish small behavioral changes. Sensitivity to small behavioral changes and the continuous measurement associated with these designs help facilitate the development of appropriate programs, monitoring of progress, and immediate modification of programs when necessary.

Purpose

The purpose of the present work was to determine the number and types of single-subject research studies reported in selected professional journals for the 10-year period between 1977 and 1986. These studies were delimited to those that involved one or more subjects from the preschool handicapped population or their families.

Methodology

Criteria used to identify articles were defined and then implemented by two reviewers who analyzed the following seven selected journals: American Journal of Mental Deficiency (AJMD), Journal of Learning Disabilities (JLD), Journal of Special Education (JSPED), Exceptional Children (EC), Mental Retardation (MR), Journal of the Division for Early Childhood (JDEC), and Topics in Early Childhood Special Education (TECSE). JSPED and EC provide a forum for a broad spectrum of exceptionalities. AJMD and MR maintain a wide circulation and cover a large diversity of topics relating to mental retardation. JLD, while specializing in one exceptionality, is a multidisciplinary publication with both national and international contributors. These five journals were chosen because they were thought to be representative of the general body of special education literature during the period studied. Also selected for the study were JDEC and TECSE, two relatively new publications that specialize in early childhood special education (ECSE). These journals have been published for seven and six years, respectively.

Criteria for the inclusion of articles in the survey required that an article contain experimental research which (a) was reported in a first-time publication; (b) had at least one baseline phase; (c) had at least one intervention phase;

(d) attempted to demonstrate a functional relationship between a treatment and a behavioral change; and (e) employed subjects who acted as their own control. The selected articles were then coded by journal, author, volume, page, and year published. Each article's content was then analyzed, and the data classified according to the exceptionality of the subjects involved in the study and the types of single-subject design employed.

Results

A total of twenty-eight articles[1] were found which reported single-subject research involving the preschool handicapped population or their families and met the five stated criteria. JDEC contained the highest number of reports, with eight. AJMD followed with six articles. EC had four, while MR and TECSE published three each. JLD and JSPED each published two reports for the ten-year period investigated.

Each of the articles was further analyzed to determine the exceptionality of the subjects treated and the type of single-subject design employed. As shown in Figure 1, ten studies reported treatment of preschoolers with mild or moderate retardation (MR). Nine involved students with severe or profound handicaps (S/P). Five studies dealt with parent-child

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[1]Note: The 28 articles are cited within the reference section at the conclusion of the present document.

interactions and behavioral changes. Youngsters with communication disorders (CD) were involved in five of the twenty-eight studies. Four articles reported work with preschoolers with behavior disorders (BD). Three studies involved subjects described as autistic.

In the course of this review, the following five types of single-subject designs were found to be used both alone and in various combinations: AB, ABA, alternating treatments, multitreatment, and multiple-baseline designs. The AB design (AB) consists of a dependent variable which is measured repeatedly under controlled baseline (A) and intervention (B) conditions. Although there is no certainty that behavior changes occurring during the intervention are not the result of some other uncontrolled factor, findings may be strengthened by replication with similar subjects (Tawney & Gast, 1984). The ABA design (ABA) extends the AB design by withdrawing the intervention (a return to the baseline phase [A_2]) in order to test its true effectiveness. In a variation of the ABA design, the treatment is reinstated (B_2) as an additional test or control (Sulzer-Azaroff & Mayer, 1977).

The alternating treatment design (ATD) is also referred to in the literature as a multiple schedule design, a multi-element baseline design, a randomization design, and a simultaneous treatment design (Barlow & Hersen, 1984). According to Tawney and Gast (1984), the basic feature of this design is

> the fast alternation of two different interventions or treatment conditions with an individual learner or group of learners. The interventions are alternated or counterbalanced session by session (or within sessions) rather than over time as in a multitreatment design. (p. 312)

The multitreatment design (MT) is actually a variation of the ABA design, sometimes referred to as a multiple treatment design. It alternates different interventions or combinations of interventions over time, not within sessions as in an alternating treatment design (Tawney & Gast, 1984, p. 301).

Multiple-baseline designs (MB) are within-subject designs that attempt to:

> replicate the effects of a procedure (treatment or intervention) across (a) different subjects, (b) different settings, or (c) different classes of behavior. [In this design], the intervention is introduced independently to each subject (or setting or class of behavior) in succession (Sulzer-Azaroff & Mayer, 1977, p. 519).

Often used alone, this design is also found in combination with AB, ABA, AT, or MT designs.

Figure 2 displays the percentage of studies by design. Two articles reported studies using two different designs, and therefore, the total number of designs implemented was thirty. By far the most popular type of single-subject design was an MB

design. This design was employed in twelve or 40% of the studies. Six studies (20%) reported the use of an AB design, while three studies (10%) used an MT design. The ABA and AT designs were implemented in one study each. Seven studies employed various combinations of these designs for 23.3% of the total usage.

Of the twenty-eight articles examined, eight (29%) were published in 1978 and 1979. The remaining twenty (71%) were published between 1981 to 1986, with the number accelerating between 1984 and 1986, the final three years of this investigation (Figure 3). The mean numbers of single-subject studies reported per year for the two ECSE journals and the five "generic" journals were 1.57 and 1.7, respectively.

Discussion

With an increasing number of states delivering public educational services to handicapped children ages birth through five and their families, it is encouraging to find that various sub-groups within this population are being addressed by single-subject researchers. In turn, those reports chosen for publication in professional journals provide a valuable resource to practitioners seeking validated curricula, methods, and materials.

Analysis of the present survey data concerning type of design indicates a preference for MB. This finding is consistent with Tawney and Gast's (1984) assessment of MB as

being well suited to the practical requirements of applied research because it (a) lends itself to accountability measures, (b) does not require the withdrawal of treatment, and (c) is easy enough to implement which permits teachers and parents to conduct research. Conversely, the ATD was used only one time. This is an unfortunate finding given the unique ability of the ATD to evaluate the relative effectiveness and efficiency of interventions on an ongoing or formative evaluation basis (Stile, 1987).

Another design used only once in the twenty-eight studies reported was the ABAB design. This is somewhat surprising, given ABAB's reputation as "the most powerful demonstration of experimental control" (Tawney & Gast, 1984, p. 200).

The latter findings regarding the infrequent use of the ABA, ATD, and ABAB designs, coupled with a low overall proportion of single-subject studies (28 out of over 4,000 articles surveyed for the ten-year period), have led the present authors to recommend an increased emphasis upon training in single-subject methodology for ECSE leadership personnel, and the delivery of the necessary competencies (i.e., attitudes, skills, and knowledge) to service providers at the preservice and inservice levels.

Given the variability of the data reported in Figure 3, it is difficult to predict future numbers of studies/reports employing single-subject research with the target population.

Perhaps the safest inference that can be drawn is that over time, the number of studies will increase commensurate with the trend already reported for special programs or populations in general.

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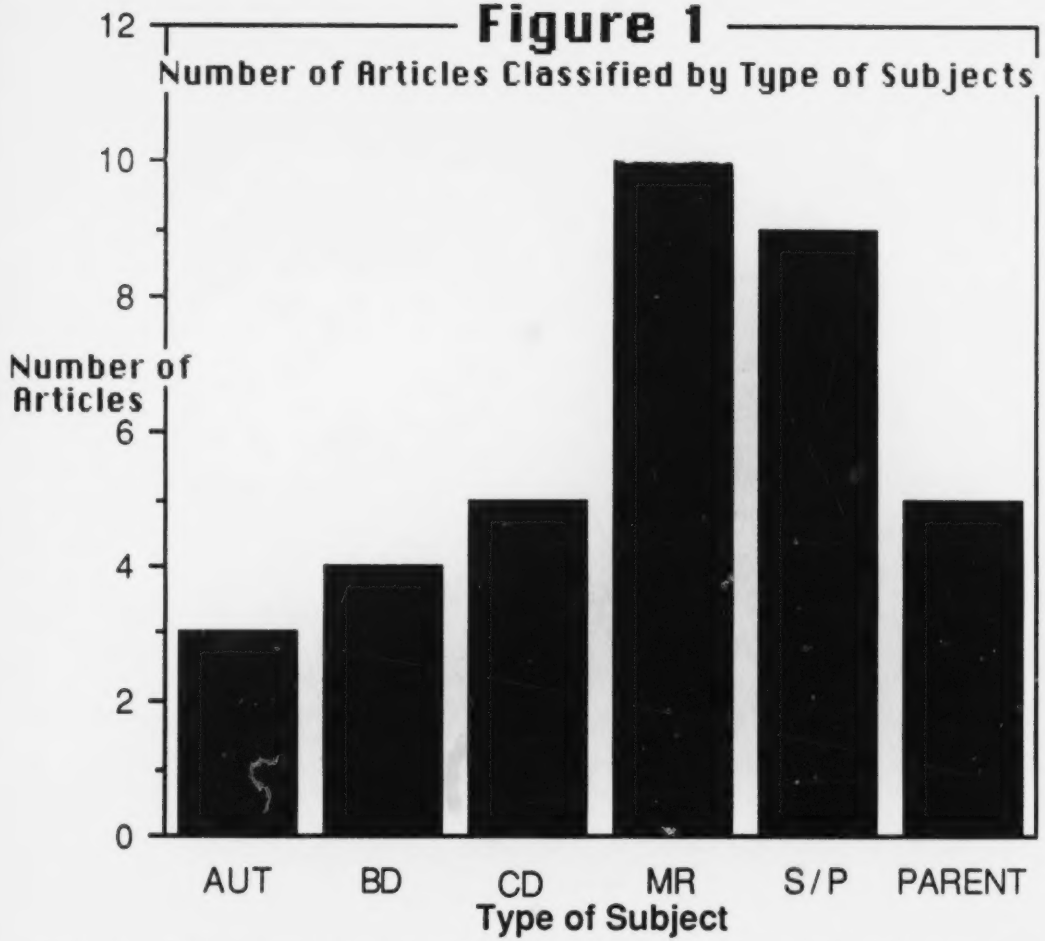


Note: Some studies treated more than one preschool population (eg. parents and moderately retarded children)

FIGURE 2

Percentage of Studies by Type of Design

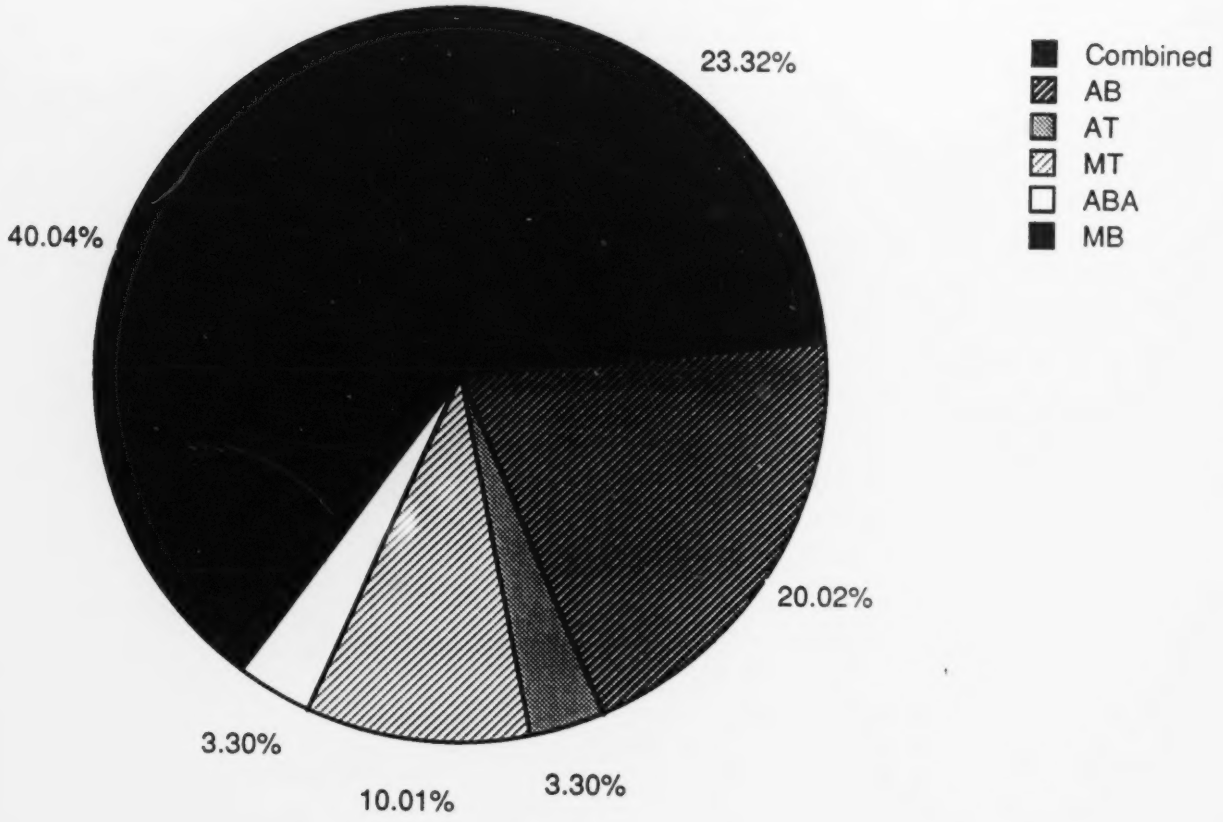
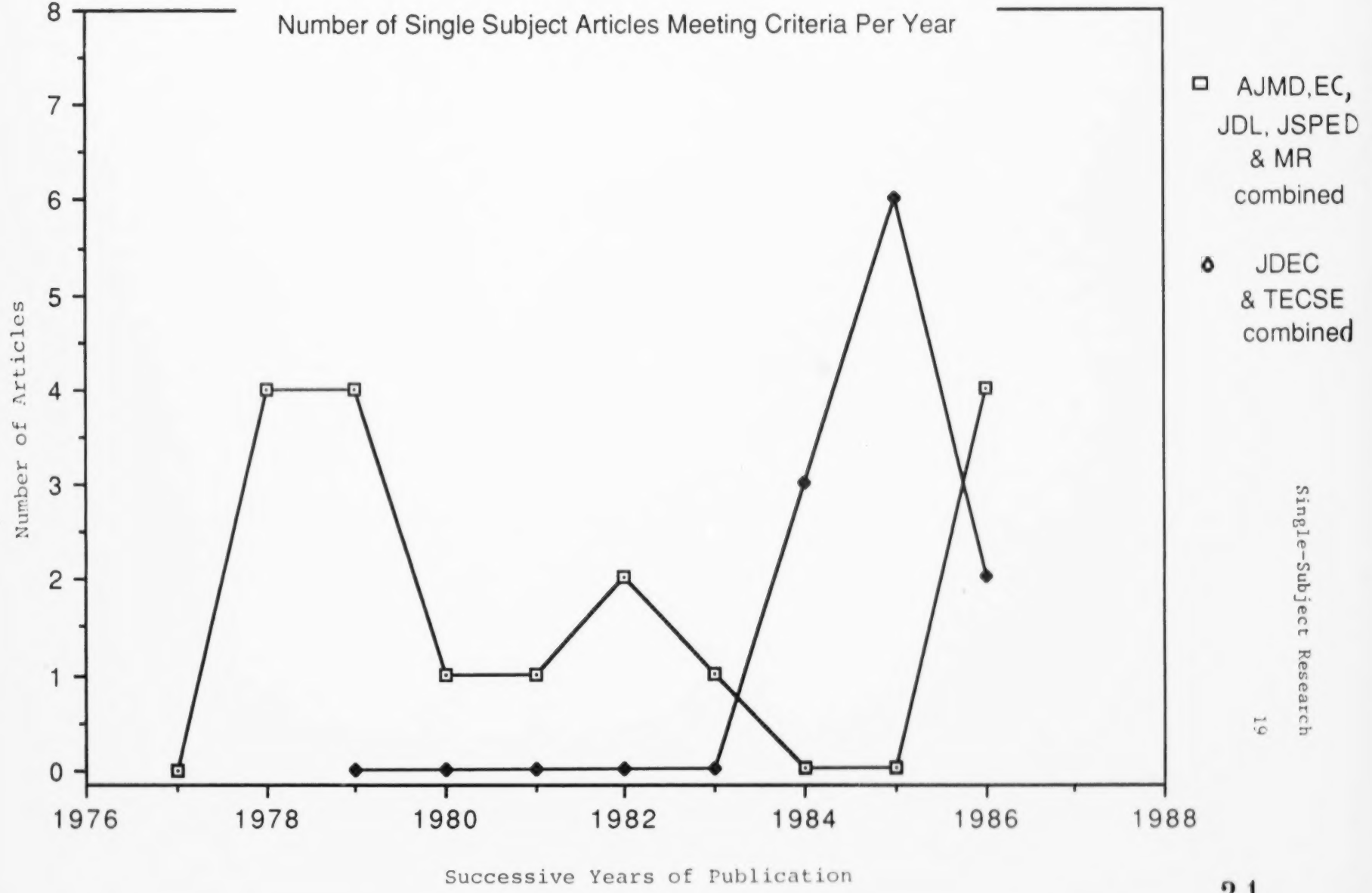


Figure 3


Number of Single Subject Articles Meeting Criteria Per Year
Number of Articles
0
1
2
3
4
5
6
7
8
1976
1978
1980
1982
1984
1986
1988
Successive Years of Publication
AJMD,EC, JDL, JSPED & MR combined
JDEC & TECSE combined